

APPENDIX I
ST. MARIES RIVER OXBOW FISHERIES AND HABITAT
ASSESSMENT

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Completed for:

**Steve Osburn
Emerald Creek Garnet, LTD.
P.O. Box 190
Fernwood, Idaho 83830**

Completed by:

**Karen Kuzis
1821 W. Jefferson St.
Boise, ID 80702**

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1.0 INTRODUCTION

Emerald Creek Garnet, LTD. (ECG) contracted Karen Kuzis, an independent fisheries consultant, to assess aquatic species and habitats within a proposed mining area adjacent to the St. Maries River, south of Fernwood, Idaho. The proposed project area covers approximately 355.8 acres of alluvial flood plain along the St. Maries River. The site is located along Idaho Highway 3 between Clarkia and Fernwood, Idaho (Map 1).

ECG has proposed to conduct mining activities within the area. This report follows the outline of a Biological Assessment, it describes the project area, identifies available aquatic habitats, macroinvertebrate and fish species potentially utilizing these habitats.

2.0 GENERAL DESCRIPTION OF THE WATERSHED

Location of Watershed and Tributaries

The proposed project area is located along the St. Maries River between Emerald and Carpenter Creeks along Idaho Highway 3 between Clarkia and Fernwood, Idaho. The St. Maries River empties into the St. Joe River approximately 35 river miles downstream of the study area. The St. Joe River empties into the south end of Lake Coeur d'Alene. There are four tributaries, which flow into the St. Maries River within the project area, Adams Creek, Pierce Creek, Hatton Creek and Olsen Creek.

Natural Physical Characteristics

Geology and Geomorphology

Recently completed Geographic Assessments of the Coeur d'Alene and St. Joe river basins describe geologic and geomorphic processes affecting the Coeur d'Alene Lake basin (PBTAT 1998). The underlying geology of much of the basin is primarily Belt meta sediments, but the southern portion of the St. Joe basin and the St. Maries basin have been modified or influenced by intrusions of the highly granitic Idaho Batholith. These intrusions have resulted in the formation of re-metamorphosed sedimentary rock that tends to be less stable than landforms based primarily on Belt meta sediments.

The St. Maries watershed tends to be more rounded with less relief than most of the rest of the basin. Streams tend to be lower gradient, meandering streams, with a high percentage of the bed and banks, comprised of finer alluvial materials and deposits from ancient Lake Clarkia.

Perennial Streams & Available Aquatic Habitat

There are four tributaries that flow into the St. Maries River within the study area, Adams Creek, Pierce Creek, Hatton Creek and Olsen Creek. All four drainages originate on the southwest slope of Crystal Peak (elevation 1680 meters) and flow southwesterly into the St. Maries River. All drainages were burned in the 1910-13 fires and have been roaded and logged over a long period of time. Ownership is a mixture of federal, state, and private. Table 1 summarizes general watershed conditions found in each tributary.

Table 1: Summary of watershed conditions for tributaries flowing into the St. Maries River proposed garnet mining area.

Creek	Order	Seasonality	Watershed Size	Watershed elevation range	Rosgen type
Olsen	4 th	Perennial	5500 acres	820 - 1680 m	B and A
Hatton	3 rd	Seasonal	1000 acres	820 - 1360 m	B and A
Pierce	3 rd	Seasonal	700 acres	820 - 1200 m	B and A
Adams	4 th	Perennial	1700 acres	820 - 1680 m	B and A

Adams and Olsen Creeks have perennial flow with direct surface connections to the St. Maries River. The banks of these tributaries will not be disturbed as part of the proposed mining operations.

Pierce Creek divides into two channels upstream of highway 3; one natural, one manmade. The natural channel contains water only during high flows; it passes under the highway and railroad and into an oxbow. This oxbow no longer has a direct (channeled) surface connection to the river. The manmade channel flows under the highway and railroad and enters the river. Both channels collect water from roadside and railroad ditches. The creek channels have seasonal flows, they are wet in spring, but dry by June. The oxbow has some permanently inundated areas.

Hatton Creek flows into an oxbow on the east side of highway 3 and has no direct (channeled) connection to the river. This oxbow is not permanently inundated and will dry out in late summer.

Vegetation Characteristics

The riparian system adjacent to the St. Maries River is an interwoven complex of meadow, shrub, and forested plant communities. The present day communities are a reflection the historic natural and cultural disturbances which have led to removal of woody vegetation, ditching, seeding, and cropping throughout most of the proposed project area. Typical floodplain geofluvial processes have also affected the floodplain vegetation creating numerous depressions, swales, abandoned channels, and truncated oxbows. This has led to a complex of varied plant associations described below.

Meadow Vegetation

Meadow vegetation varies from dry meadow to permanently inundated emergent channels and oxbows. Plant associations that have been identified in this community have developed in direct response to micro-relief and hydrologic conditions. Plant associations include Foxtail-Fescue Association, Foxtail-Canarygrass Association, Sedge-Water plantain Association and Cattail-Sedge Association.

Shrub Vegetation

Shrub vegetation is found along the perimeter of well-defined swales, depressions, and oxbows, and in uneven surfaces that have been scoured by flood flows. Two shrub associations have been identified in this community, each occurring on the landscape in response to different hydrologic conditions. The identified shrub associations include: Hawthorne/Canarygrass Association and Dogwood/Sedge Association.

Forested Vegetation

A forested plant community is found in patches throughout the study areas. Typically, two forested associations are present, one deciduous, and the second coniferous. These associations are, Cottonwood/Snowberry/Canarygrass Association and Cedar/Snowberry/Bentgrass Association.

Wetland Vegetation

Eight wetland types have been identified in the proposed area of operations. The wetland report (Carroll 1999) provides complete description of the wetland types. Only the palustrine scrub-shrub, deciduous, semi-permanently flooded wetlands (PSS1F), the palustrine forested, deciduous, seasonally flooded and saturated wetlands (PFO1E) and palustrine open water, permanently flooded wetlands (POWH) are capable of supporting fish and other aquatic organisms.

The palustrine scrub-shrub, deciduous, semi-permanently flooded wetlands are found in swales, oxbow edges, and along the river margin where typical inundation is 6 to 24 inches. Wetland hydrology in this association is present in the spring, prior to the growing season, and extends well into the hot summer months, but becomes dry before the end of the growing season.

The palustrine forested, deciduous, seasonally flooded and saturated are found on uneven, scoured topographic highs where typical inundation is 0 to 12 inches. Wetland hydrology in this association is present in the spring, prior to the growing season, and during the early portion of the growing season. These wetlands typically become dry during early summer (end of June) and lack wetland hydrology the remainder of the growing season.

The palustrine open water, permanently flooded wetlands typically are inundated more than 48 inches. Wetland hydrology is present in the spring, prior to the growing season, and extends throughout the growing season. These wetlands include the oxbows and are the provide most of the available aquatic habitat.

Macroinvertebrates

A variety of aquatic macroinvertebrates are known to occur in oxbows, wetlands and vernal pools in North Idaho. The most diverse group are the aquatic insects, which include at least nine orders and hundreds of species (refer to Idaho Department of Environmental Quality macroinvertebrate taxa list). Some insects are of importance from a conservation biology perspective, particularly dragonflies and damselflies (order Odonata). Most insect species, however, are quite common and widely distributed. Even without performing any surveys of the invertebrate fauna, it is likely that at least the following invertebrates would be found in aquatic habitats in the project area:

- Ephemeroptera (mayflies)
- Odonata (dragonflies and damselflies)
- Hemiptera (water boatmen, backswimmers, water scorpions, etc.)
- Neuroptera (spongilla flies and alderflies)
- Trichoptera (caddisflies)
- Lepidoptera (aquatic moths)
- Coleoptera (beetles)
- Diptera (flies)

A variety of other invertebrate groups will likely occur including:

- Porifera (freshwater sponges)
- Cnidaria (Hydra)
- Nematoda (parasitic roundworms)
- Gastropoda (snails)
- Bivalvia (clams)
- Oligochaeta (worms)
- Hirudinea (leeches)
- Hydrachnida (mites)
- Cladocera (zooplankton)
- Branchiopoda (tadpole and fairy shrimp – vernal pools)
- Ostracoda (seed shrimp)
- Copepoda
- Decapoda (crayfish)

Not all groups of organisms may be present in any given pool, but all groups can potentially be found in the project area.

Human Uses

Early logging in the Coeur d'Alene Lake basin was largely centered on the river valley bottoms where logs could be easily skidded or transported by flume to the river and ultimately floated to downstream mills. Railroad logging was common in portions of the Coeur d'Alene River and St. Maries watersheds. Prior to the establishment of the Idaho Forest Practices Act and the National

Forest Management Act, streams and riparian areas received little protection from harvesting, skidding and processing activities. The legacy of these activities still affects fish habitat in some areas of the basin and they must be addressed to protect and restore fish habitat.

Agricultural activity is largely confined to the valley bottoms along the lower Coeur d'Alene, St. Joe, and St. Maries Rivers. Grazing allotments were established on some National Forest lands following the wildfires of 1910 and the 1930's. Large numbers of sheep were grazed until natural plant succession decreased forage, making grazing infeasible. Some cattle grazing allotments still exist in portions of the Coeur d'Alene and St. Marie's watersheds, and private ranches dot the valley bottoms.

A large garnet placer mining operation in the St. Maries River watershed has resulted in significant alterations to Emerald and Carpenter Creek since the 1940's. Current mining operations in these streams have placed considerable emphasis on reclamation in recent years, with significant improvements to aquatic habitat as compared with conditions between 1950 and 1990. Garnet mining operations still significantly alter stream courses, but reclamation generally is completed within two years of disturbance. New placer mining for garnets is currently being proposed along a 3.2-mile reach of the St. Maries River between the mouths of Emerald and Carpenter Creeks.

In the early 1900's a major rail line (the Milwaukee) was constructed through the North Fork St. Joe River drainage and then down the mainstem St. Joe River. A spur line was constructed along the St. Maries River. Several short line railroads were constructed around the basin for logging purposes. With the exception of the St. Maries River Railroad (which uses a portion of the Milwaukee line along the St. Maries and lower St. Joe rivers) none of these rail lines are functional any longer. However legacy effects of past construction practices are evident and old, unmaintained railroad beds continue to pose serious risks to fish habitat in some portions of the basin.

3.0 FISH SPECIES NARRATIVE

Fish Species Documented or Potentially Occurring

Bull Trout in the Upper Columbia River population are listed as threatened by the U.S. Fish and Wildlife Service (6/10/1998, 63 Federal Register 31647-74). Regionally sensitive fish species possibly occurring in the project area or in tributaries are west slope cutthroat trout (*O. clarki lewisi*). Because of their recognized regulatory status these species are given special consideration in this assessment.

There have been occasional reports of bull trout in St Maries River but there are no established bull trout populations known in the watershed (C. Corsi IDFG, personal comm.). Cutthroat trout do occur throughout the St. Maries watershed, they have been observed in Emerald Creek, Carpenter Creek and likely occur in the other tributaries. Cutthroat populations are likely depressed from historic levels due to the long history of modifications to the river systems. The St. Maries River in the study area is highly modified and does not contain usable spawning and rearing habitat. The upper portions tributaries draining into the study site do contain spawning

and rearing habitat but the quantity of available spawning and rearing habitat in the has not been quantified.

In August 1999 the oxbow habitat were sampled visually and with electroshocking equipment. Species sampled in this effort were; reidside shiners, *Richardsonius balteatus*, northern pike minnows (formerly northern squawfish), *Ptychocheilus oregonensis*, and bridgelip suckers, *Catostomus columbianus*. Table 2 summarizes the locations and fish species sampled, the site locations are illustrated on Map 1. No cutthroat or bull trout were sampled or observed. The oxbows had deep silty or clay substrates limited cover and warm water. These habitat conditions are not considered suitable for cutthroat and bull trout. Cutthroat trout and bull trout are not typically found in these types of habitat conditions.

Table 2: Summary of fish species sampled during August 1999 electroshocking effort.

Site/ Location	Description	Fish Sampled
Site 1: Hatton Creek below railroad culvert	2-3 ft deep, silty substrate	6 shiners 2-3" long, school of 50+ fish observed
Site 2: Hatton Creek Oxbow	3 ft deep beside emergent Typha and Carex. Deep silty substrate	3 N. Pike Minnows 2-3" long
Site 3: Hatton Creek Oxbow	3.5 feet deep, in shade of Alnus	4 N. Pike Minnows 2-5" long
Site 4: Hatton Creek Oxbow	3 feet deep nearest river	1 Shiner 2" long
Site 5: Pierce Creek Oxbow	3-5 feet deep in shade of willow	1 N. Pike Minnow 1" long 1 Sucker 3" long
Site 6: Isolated Oxbow in high flow channel	1-2 foot deep, silty, clay substrate	5 N. Pike Minnows 1-2" long 4 Bridgelip Suckers 3" long 1 N. Pike Minnow 3" long

Habitat Condition and Trends

Cutthroat and bull trout do not typically utilize oxbow habitats except as a seasonal migration corridor. The oxbows in the study area do not have perennial surface water connections to the St. Maires River and therefore would only potentially provide access to the upper portions of the tributaries. The August 1999 sampling effort provided visual qualitative descriptions of habitat conditions in the oxbows, no effort was made to quantify potential habitat in these areas. The St. Maries River, Adams and Olsen Creeks provide the only potential habitat in the proposed project area however the river and creek channels will not be disturbed by the proposed project. Following is a general description of habitat conditions and impacts within the St. Maries basin.

Fine sediment is a problem in portions of the St. Maries watershed (PBTAT 1998). Channel instability caused by excess bedload deposition, loss of woody debris, stream alterations, or other factors may be resulting in mid-winter floods due to scour and shifting of bed sediments. Over 50% of the tributaries (second order and larger) to the St. Joe, St. Maries, and Coeur d'Alene rivers have significant reaches, which are significantly affected by roads in floodplains or adjacent to stream channels (PBTAT 1998). These roads (and old railroad beds) paralleling

streams typically constrain channel meanders, reduce floodplain capacity, and reduce or eliminate riparian areas and large woody debris recruitment.

Livestock grazing along the St. Maries River and some of its tributaries is likely interfering with successional processes that would lead to more shade and stream bank stability (PBTAT 1998).

Life History Characteristics

BULL TROUT & CUTTHROAT TROUT

Bull trout and cutthroat trout occur together in many drainages above present day human caused barriers, indicating early colonization. Bull trout may either be residents spending their entire lives in small headwater streams or they may rear and mature in large lakes and rivers migrating into small headwater lakes and streams for spawning (Bjornn 1961). Bull trout which remain in cold headwater streams their entire lives usually do not exceed 25 cm in length, whereas those that move to lakes where forage fish are plentiful can attain weights of more than 10 kg.

West slope cutthroat trout may be found throughout large river basins but spawning and early rearing occurs mostly in headwater streams. West slope cutthroat trout less than 100 cm are found predominantly in pools and runs. The distribution and abundance of larger west slope cutthroat trout is strongly associated with pools and in general stream reaches with numerous pools support the highest densities of fish (McIntyre and Reiman 1995).

4.0 REFERENCES

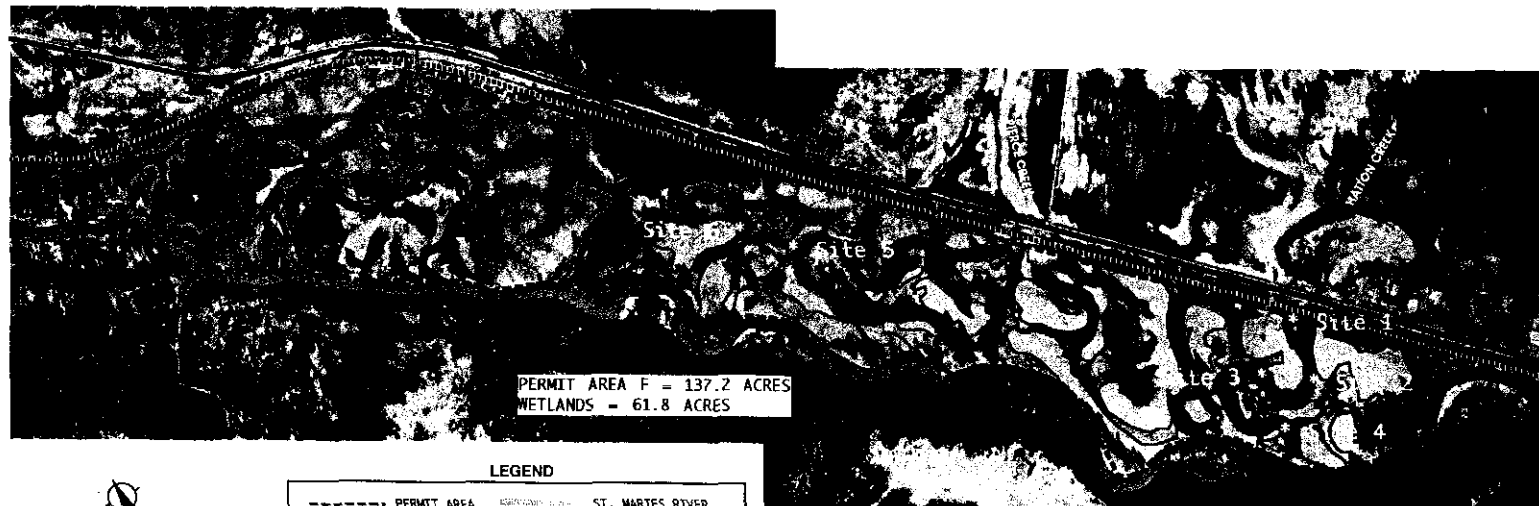
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Map 1: Locations of sites sampled for fish during August 1999 electroshocking effort.



SCALE: 1 inch = 700 feet

LEGEND

-----	PERMIT AREA	-----	ST. MARIES RIVER
-----	STREAMS	-----	STATE HIGHWAY 3
-----	WETLANDS	-----	ST. MARIES RAILROAD

FROM: March 27, 1995 Color Aerial Photography, 1:15840